

1G1a Circulating fine particles in a quasi-weightless solution

A technique to realize a containerless protein crystallization with a magnetic force

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By means of an upward magnetic force, quasi-weightless condition on earth is possible by canceling the effect of gravity [1]. This technique has the advantage of being able to keep the condition for a long time. Owing to this merit, as I have already reported, I succeeded in crystallizing hen-egg lysozyme in the air-liquid interface of the solution by the use of both gadolinium chloride, which is used as a precipitant agent [2]. The mechanism of this phenomenon is explicable with magneto Archimedes effect [3]. In particular, when the magnetic force acting on the crystals is cancelled the gravity at the center position of the solution, lysozyme crystallizes at the solution interface and at the vessel bottom, as shown in Fig. 1.

Surprisingly, we discovered that a lot of fine particles were circulated in the solution, even after the crystal growth had already been stagnated (see a white fine particle suspended in the black solid circle in Fig. 1). Although the details of the crystal quality have not been examined yet, but there is no doubt that these particles were lysozyme. That is, these fine particles were grown in a perfect containerless condition. If so, our result would present a technique to realize high quality protein crystals from a liquid phase. In this seminar, we will present some movies not only the circulating fine particles, but also the growing crystals completely levitated at the air-liquid interface.

References

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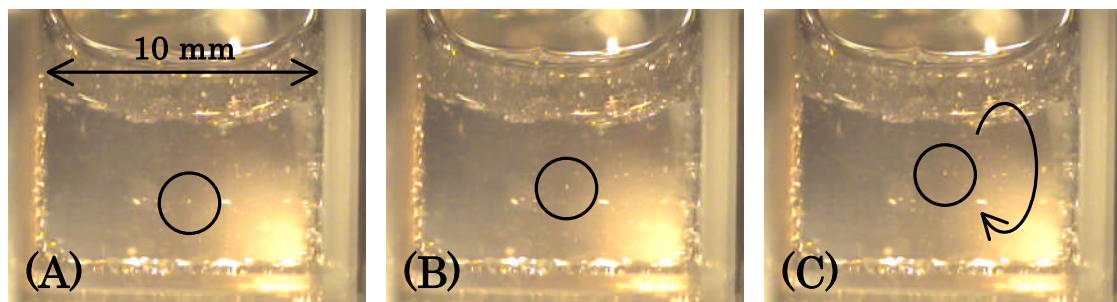


Fig. 1 Path of a circulating fine particle. Magnetic field was 3.5 T. (A) $t = 0$, (B) $t = 2.4$ s, (C) $t = 4.8$ s. Most lysozyme crystal was deposited both at the solution interface and the vessel bottom.